



## STAR FIELDS

Newsletter of the  
Amateur Telescope Makers of Boston  
Including the Bond Astronomical Club  
Established in 1934  
In the Interest of Telescope Making & Using

Vol. 27, No. 9    October 2015

### This Month's Meeting . . .

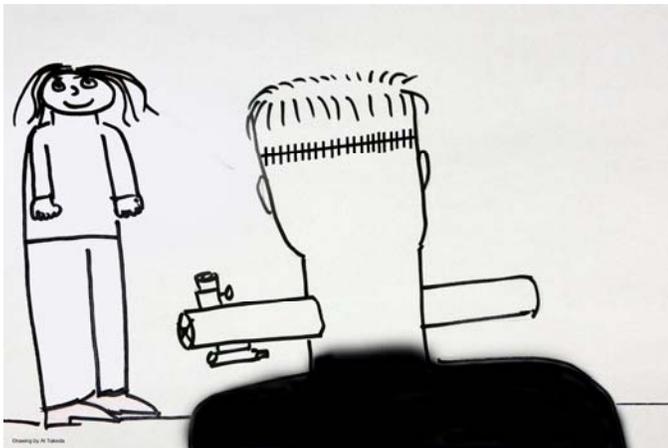
Thursday, October 8<sup>th</sup>, 2015 at 8:00 PM

Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at the CfA is allowed for the duration of the meeting

### Astro Humor, with Glenn Chaple



"Mr. C...., that sound might be a few loose bolts in the tube assembly". \*

This month's speaker will be Glenn Chaple, presenting material from his vast collection of astronomy-oriented humor. As a long-term writer and speaker in the field of astronomy, he's well-positioned to bring us a very entertaining evening!

In Glenn's words... "I've been an avid amateur astronomer since the summer of 1963 when a high school friend showed me Saturn through his telescope. I received a BS degree in astronomy from UMass Amherst in 1969, and then worked for two years at the Alice G. Wallace Planetarium in Fitchburg, Mass. From 1974 until my retirement in 2006, I was a middle school science teacher in the Fitchburg and Groton-Dunstable school systems. I co-authored, with Terence Dickinson and Vic Costanzo, the *Edmund Mag 6 Star Atlas* and wrote the books

*Exploring With a Telescope* (Franklin Watts – 1988) and *The Outer Planets* (Greenwood Press - 2009). I contributed chapters on double stars to David Eicher's *Deep-sky Observing With Small Telescopes* (Enslow Publishers – 1989) and James Muirden's *Sky Watchers Handbook* (W.H. Freeman – 1993). Between 1977 and 1987, I wrote a column on double stars for *Deep Sky Magazine*. From 1982 until 1994, I authored the "What's Up?" column for the children's astronomy magazine *Odyssey*. Since 2002, I've been writing the monthly "Observing Basics" column for *Astronomy* magazine. I've been a member of both the Amateur Telescope makers of Boston (currently Vice President) and the American Association of Variable Star Observers (AAVSO) since 1980. In 2006, I joined the Astronomical League, and, in 2011, the Astronomy Outreach Foundation."

Please join us for a pre-meeting dinner discussion at Changsho, 1712 Mass Ave, Cambridge, MA at 6:00pm before the meeting.

### September Meeting Minutes . . . . .



Alan Sliski \*

Minutes of ATMoB meeting held on September 10, 2015 in the Phillips Auditorium at the Harvard-Smithsonian Center for Astrophysics.

President Neil Fleming and VP Glenn Chaple were unable to attend the meeting so Treasurer Eileen Myers officiated the meeting that was started at 8:00 PM.

- The Secretary's Report of the September meeting was given by Sidney Johnston.
- Eileen Myers gave the Treasurer's report.
- Tom McDonagh gave the Membership Report.
- Glenn Chaple's slides were used by Eileen Myers to present the Observing Committee Report.

Paul Courtemanche was the winner of Stellafane's Small Telescope Optical competition with his 8-inch, f/9 Dobsonian mirror that was made at the Clubhouse. Master optician Phil

Rounseville said that in his opinion, "it was the best mirror judged at Stellafane in the last decade".

Alan Sliski's also won first place in the Mechanical Special Award category for his "Advanced Foucault Tester".

A photo was shown of Mike Hill with his small Dobsonian entry.

Member reports of the Perseid meteor shower were given.

The "International Observe the Moon Night" on September 19th was announced.

A total lunar eclipse with the Super moon will start on the night of Sunday, September 27th. The Clubhouse will be open for this event. A public event will also be held at the Harvard-Smithsonian Center for Astrophysics (CfA).

The Sue French Fan Club object for this month is the double star theta Serpentis.

The observers challenge from the Las Vegas Astronomical Society is the North America emission nebula in Cygnus. An Oxygen III filter is a recommended accessory to help one see this object.

The Object of the Month is the carbon star in Cepheus.

- Steve Clougherty gave the Clubhouse report. He reported that there has been a lot of observing being done at the Clubhouse on the weekends. While smoke from the wildfires in the northwestern U.S. diminished our views during the summer, the smoke has started to dissipate during the month of August.

Lawn mowing, brush clearing, tree trimming, painting and other outdoor tasks were tackled. The next work party will occur on September 26th.

- Announcements:  
Dick Koolish reminded the members that the CfA holds a public night on the 3rd Thursday of the month and that a few of the ATMob members help out.

Eileen Myers announced that the ATMob Club Picnic will take place at the Clubhouse starting at 3 pm on September 19th.

- Old Business:  
Mario Motta advocated that towns should put in 3,000 Kelvin or less LED street lights, and not the higher degree Kelvin ones. Citizens of some cities that put in the higher degree Kelvin lights have complained because of the increased glare. In some of those communities the fixtures were eventually replaced by 3,000 Kelvin LEDs.

Eileen introduced Alan Sliski as this evening's speaker. Alan gave a talk about his restoration of a 1916 Warner and Swasey telescope mount made for an Alvan Clark telescope. He also

presented some reflections on the history of precision machine tools and the American system of interchangeable parts.

Alvan Clark & Sons of Cambridgeport, Massachusetts produced some of the finest telescope optics and they hold five world records for the biggest lenses ever produced. The largest is the 40-inch objective that was installed at the Yerkes Observatory. Their moniker, "Artist in Optics", was coined by the title of a book written about their company by Deborah Jean Warner.

Before Warner and Swasey, all telescopes and their mechanical components, such as focusers, were one-off, custom made products. All dimensions and even bolt and thread sizes were different with each new telescope.

The origin of manufacturing interchangeable parts required precision machine tools and gauges, and also dimensional and thread standards. Manufacturing with precision machine tools was started at the Armory in Springfield, Vermont. Robbins and Lawrence, of Windsor, Vermont, exhibited rifles with interchangeable parts at the 1851 London Crystal palace exhibition. Those parts were made using precision machine tools made in Windsor, Vermont, and were distributed throughout the Connecticut River Valley.

Worcester Reed Warner and Ambrose Swasey were both born in 1846. They met at the American Safety and Engine Company in Exeter, NH, and later both went to work at Pratt & Whitney (P&W) in 1869. At P&W, they worked on gear profiles, standards, and making parts interchangeable. While in Hartford, Warner and Swasey spent free evenings tinkering with telescopes, eventually using \$1,000 to purchase a 9.5-inch-diameter lens from Alvan Clark & Sons, and built a tube, mount, and pier for it. Doing so they learned engineering considerations for a medium-sized observatory-class instrument. In April 1880, with joint savings of \$10,874, Warner and Swasey quit Pratt & Whitney and boarded a train heading west to Chicago to establish their own firm. They eventually wound up in Cleveland, Ohio and in 1881 launched their company. Their flagship product was a line of turret lathes.

The first telescope and mount made by the pair was an assembly that held a 9.5-inch refractor that was installed at Beloit College in 1880. In 1916 the mount and tube assembly was sent back to the company and was eventually donated to the Smithsonian Institution. However the original Alvan Clark lens, made in 1878, stayed with Beloit College, and Warner and Swasey built a new, state-of-the-art mounting for them.

A new approach to telescope mount construction was introduced by Warner and Swasey. Formerly, the slewing and RA settings were done at the pier. One of the major advances made by Warner and Swasey was to create a good user interface, placing the fine motion controls and locks at the eyepiece end of the tube. Rearranging the controls to this new position became mechanically complicated. Lots of parts, gears etc. are needed to put the controls at a convenient location for the user. The user interface is not as easy to do as is coding a GUI (graphical user interface) on a smartphone.

The other change was to approach the telescope mount as a standardized product made to drawings, using machine tool technology, rather than a unique instrument made by craft. Sixty three (63) refractors were made by Warner and Swasey using these advances. They made many large refractor telescopes, 36" and 40" being the largest, including the 40-inch refractor at the Yerkes Observatory.

The 9.5-inch telescope and mount has had extensive travels. Beloit College utilized the telescope from 1916 until 1965. In 1967 the entire system was acquired by Dave Garroway, the original host of the Today Show on NBC. He moved the telescope and mounting to his home in Scituate, MA and installed it in a 16-foot dome. In 1971 Mr. Garroway moved to California and chose not to take the telescope and mount with him. In August, 1971 Mr. Garroway, sold the unit to Keystone College in Pennsylvania. In 1996 the Clark lens and the 3 1/2 inch finder telescope, were installed on a new equatorial mount with a modern electronic drive system. The 1916 Warner & Swasey mount and tube assembly (minus the lens and cell) were sold to a telescope collector, Bob Hambleton, in Maryland. In June of 2010, the disassembled telescope mount and tube was purchased by Alan Sliski and moved to Lincoln, Massachusetts where a complete restoration was begun.

Alan presented many images of dirty parts before cleaning, and beautifully, shiny cleaned parts after he was finished. All of the parts of the disassembled mount and tube assembly required different cleaning techniques.

Parts	Cleaning technique
Big cast iron parts	Sandblast, fill, prime
Small cast iron parts	Glass bead blast
Large bronze pieces	Soda blast, paint stripper
Small bronze parts	Vibratory tumble with walnut shells, and sand through 1200 grit, polish

The original clock drive was disassembled and its many parts cleaned. After reassembly, the clock was installed into the mount. New control knobs were machined from wood using the original drawings.

Before reassembly, he coated the cast iron portions of the mount with a cobalt blue finish, used polyurethane on the wooden parts and applied a white paint to the tube assembly.

Because Keystone College retained the 1878, 9.5-inch Alvan Clark lens, Alan asked the membership to be on the lookout for an equivalent antique lens. Although Alan would prefer to place an antique lens into service, he has looked into making a new lens that is a replica of the original one.

He was also trying to find out what the original Clark lens cell was made of. He took a "sliver" from one of his own Clark cells and had the sample placed in a scanning electron microscope with an X-Ray detector. It was determined that the cell is a copper and tin alloy (see below).

Carbon, weight % 2.98  
 Oxygen 3.137  
 Ar, weight % 0.0  
 Ca, weight % 0.0  
 Cu, weight % 57.019  
 Ru, weight % 0.0  
 Sn, weight % 36.865.

Should Alan decide to fabricate a new mirror, he has already investigated a few different optical configurations. He presented an optical spot diagram for a 9.5-inch f/15 Fraunhofer doublet, and a spot diagram for a 9.5-inch f/15 Triplet lens design. He also presented a Solidworks diagram of a new lens in a new cell.

The meeting was adjourned at 9:30 PM

~ *Sidney Johnston, Secretary* ~

## Membership Report . . .

Membership count as of September 24, 2015 is at 198 individuals, where at the same time last month we had 338 members in good standing.

Please welcome our newest and returning members:

Alan Feuerbacher, Vincent Roche, Jan Kansky, Nestor Barros and Amber McDonald

The membership renewal period ended September 1st. Please renew today, time is running out! Many members' subscriptions to *S&T* and *Astronomy* magazine are tied to their last renewal date. You can avoid interruption of subscription delivery by renewing now! Instructions for renewing and checking your membership status are outlined below:

- Log into the [www.atmob.org](http://www.atmob.org) website using your email on record with the club as your login ID.
- If you cannot access the website or have forgotten your password, please contact me via email at [membership@atmob.org](mailto:membership@atmob.org). Do not log in as a new perspective member if you have forgotten your login id or password. This creates a problem in tracking membership and magazine subscriptions. When in doubt, contact your Membership Secretary!
- Once you have successfully logged in, click the "Your Details" tab found on the top right portion of the page.
- In the middle of the page, click on the "Renewals" tab.
- Click on the "Renew your membership" tab and follow the instructions. One can renew using PAYPAL or personal check. Please feel free to contact me with any questions, concerns or issues.

New members on record in 2015 are not required to renew at this time.

Our communication lifeline includes the ATMOB-Announce and ATMOB-Discuss mailing lists as well as our fantastic newsletter. Please refer to these tools for up to date information on club openings, events and interesting astronomy related discussions. Contact me with questions regarding accessing these options at: [membership@atmob.org](mailto:membership@atmob.org).

The Amateur Telescope Makers of Boston, Inc. is a 501(c)3 organization. Donations are gladly accepted and are tax deductible to the fullest extent allowed by law. Consider making a tax-deductible contribution to the club during your estate and tax planning this year. Many companies make matching contributions at an employee's request. It is a simple way to make your donation go twice as far.

~ Tom McDonagh – Membership Secretary ~

## Clubhouse Report . . .



(L-R) Paul Courtemanche, Joe Henry and George Paquin grading pads \*

### September 2015 Clubhouse Report

A work session was held at the ATMOB Clubhouse on Saturday Sept 26th beginning at 10 am. The weather was very pleasant and several outdoor projects were completed. A total of 15 members and friends were present.

The composting toilet was cleaned and serviced for another year. Many thanks to Cheryl Rayner for handling this project for the second year in a row. Another group of volunteers hauled soil from the back lot to the South observing field and leveled the grade surrounding four observing pads. Rich topsoil was added and the entire area was seeded and fertilized before the end of the day.

Thanks to Paul Courtemanche for volunteering to stop by the clubhouse over the next two weeks and watering the newly seeded land.

Another project led by Dave Prowten involved the construction of a four by five foot wooden ramp for the telescope shed. Previously, members had to lug two heavy ramps to the shed each time a telescope needed to be rolled out to the observing

field. Needless to say, Dave did a magnificent job, and the new ramp makes this effort much easier.

Bruce Berger and Alan Sliski replaced the ATMOB Research and Imaging Observatory (ARIO) dome shutter motor last month and the shutter now works properly.

Thanks to the lunch crew for all of the food prep, cooking and cleaning during the work party.

The following members and friends of the ATMOB made this work session a success: Bruce Berger, Barbara Bosworth, Paul Cicchetti, Steve Clougherty, Paul Courtemanche, Nina Craven, Tom Haspin, Joe Henry, Eric Johansson, Dick Koolish, John Maher, Eileen Myers, George Paquin, Cheryl Rayner, Art Swedlow, Al Takeda and Bill Toomey.



Dave Prowten working on the telescope shed ramp. \*

The next work party will take place on Saturday, Oct. 24th.

~ Clubhouse Committee Chairs ~

~ Steve Clougherty, John Reed and Dave Prowten ~

Clubhouse Saturday Schedule		
Oct 10	Karl Dean	Nina Craven
Oct 17	Bruce Berger	Mike Hill
Oct 24	<b>WORK PARTY # 11</b> Bill Toomey + Neil Fleming	
Oct 31	John Panaswich	Dave Siegrist
Nov 7	Bill Robinson	John Small
Nov 14	Art Swedlow	Sai Vallabha
Nov 21	George Paquin	Dave Prowten
Nov 28	<b>WORK PARTY # 12</b> Glenn Chaple + Joe Wolfe	
Dec 5	Paul Cicchetti	John Reed

# Sky Object of the Month . . .

October 2015

Messier 2 (NGC 7089) – Globular Cluster in Aquarius



M2 image by Mario Motta

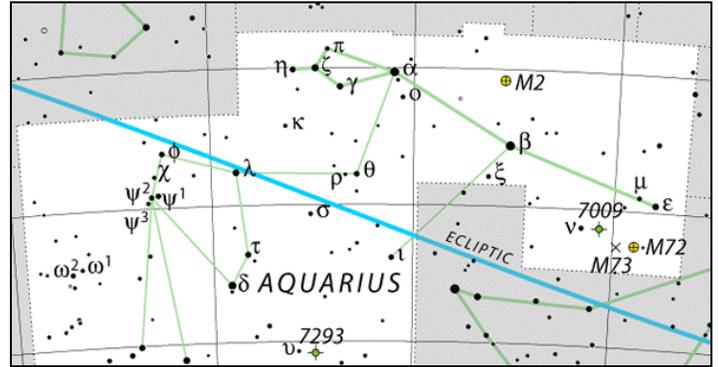
October can be a depressing month for the globular cluster aficionado. Sagittarius, Scorpius, and Ophiuchus and their treasure trove of globular clusters have ridden off to the west, leaving us with the barren-looking skies of autumn.

But all is not lost! Pegasus is home to the wonderful globular M15, and Aquarius sports a pair of globs, M2 and M72. The former is our “Object of the Month” and a worthy rival to M15.

M2 was discovered by French astronomer Jean-Dominique Miraldi in 1746, and catalogued by Charles Messier 14 years later. At magnitude 6.5, M2 is barely visible to the unaided eye from dark-sky locations. You can find it with binoculars or finderscopes by searching the area 5 degrees north of beta ( $\beta$ ) Aquarii and looking for what appears to be an out-of-focus star. Viewed with small-aperture scopes and magnifications between 60-120X, M2 is an unresolved, condensed circular haze some 5 or 6 arcminutes in diameter. Larger scopes and magnifications in excess of 150X expand the overall dimensions to 8-12 arcminutes and reveal stars in the outer regions.

Recently, I compared M2 and M15 with my 13.1-inch Dob and an 18-inch Dob owned by fellow ATMoB member Steve Clougherty. Both globulars appeared similar in size; their outer regions nicely resolved by the two scopes. M15 seemed more concentrated toward the middle – a surprise to me, as some observing guides describe M2 as having an almost stellar-looking center. I didn’t see it; neither did Clougherty. What’s your opinion?

M2 lies about 37,000 light years away. It’s one of the richer and larger globular clusters - an estimated 100,000 stars fill an area 175 light years across. At a calculated age of 13 billion years, M2 is also one of the oldest globular clusters in the Milky Way.



[www.constellation-guide.com](http://www.constellation-guide.com)

~ Glenn Chaple – Observing Committee and VP ~

## Annual Club Picnic . . .



Mario Motta Demonstrating Mirror Making \*

The annual Club Picnic was held this year on Saturday, September 19<sup>th</sup>. The Clubhouse Directors and the Picnic Coordinators Eileen Myers and Al Takeda would like to extend a huge thank you to all who helped make it a great success. Comments received on the days following were that it was the best picnic ever: great food (particular mention was made of Bob and Judi Toop’s monster-sized chocolate cake) and some of the best equipment ever set up for solar observing. Thank you to everyone who bought, prepared, and created such tasty treats. The food was terrific. The desserts were fantastic. Overeating was rampant!



Mario Motta. Image by Julie Sussman

There were over 70 attendees coming and going throughout the day, and at least 20 Picnic Committee workers prepared for and ran events. 6 workers came back the next day to break down tents and tables, and finish the cleanup.



Bill Toomey leading a group to see the Haystack antennas \*

Special activities included:

- Kids activities led by Julie Kaufmann
- Mirror grinding demonstrations led by Mario Motta.
- Descriptions of the history and uses of the huge radio telescopes up-the-hill during the annual walk led by Bill Toomey
- Solar viewing in white light (some scopes with Herschel wedges), and hydrogen alpha
- Examining a 1920s Russell Porter design garden telescope brought by Ken Launie and Sara Schechner
- Tours of the Clubhouse led by John Maher



Ken Launie displays his Porter garden telescope \*

During the days leading up to the picnic, Nina Craven, Al Takeda, Nkosi Muhangi, Bob Toop, John Maher, and Eileen Myers did much vacuuming and dusting, general cleaning,

straightening up, miscellaneous repairs, and putting up of new posters donated by Bernie Kosicki, and saw horse repair by Dave Prowten.



The tent squads consisted of Bill Toomey and his brother Ray (who brought over Ray's large tent) along with Bill's son, and Al Takeda, Nkosi Muhangi, Dave Prowten, Sai Vallabha, Paul Cicchetti, Eileen Myers, Hugo Alvarez and his son Diego, and George Paquin.

All kinds of food related tasks during the picnic were performed by Al Takeda, Julie Kaufmann, hot dog and hamburger cook Eric Johansson, Sai Vallabha, Marsha Bowman, Art Swedlow, Dick Koolish, John Maher, Joe Wolfe, Sergio Simunovic and others.

Food and supplies shopping was done by Eileen Myers, along with donations of paper goods from Steve Clougherty.

Solar scopes were set up and operated by Phil Levine, Paul Cicchetti, John Denny, Michael ..., Julie Kaufmann and those who set up Julie's equipment, and others.



John Stodieck observing the Sun in Hydrogen-alpha \*

Club observatories and telescopes were open for tours and viewing:

- John Maher operated the Clamshell Observatory 10-inch Schmidt-Cassegrain
- Jim Gettys operated the ATMob Research and Imaging Observatory (ARIO) 14-inch.
- Eric Johansson and Al Takeda operated the 6-inch Shupmann
- Sai Vallabha operated the 17-inch Dob
- Two smaller club scopes were set up in the field (one operated by Courtenay Smith, the other by another member)

Other scopes for night sky observing were set up by Nkosi Muhangi, John Blomquist, Nick Hariskos, Landon Bickle, and others.

Many club members brought family and friends, and three of those joined at the picnic.

We know we missed many names, and apologize, as we were so busy and having such a good time we missed some of the action going on all around.

A good time was had by all.

Please post your picnic photos at the club website.

~ Submitted by Picnic Coordinators Eileen Myers & Al Takeda ~

## Deep Space Mysteries 2016 Calendars for Sale . . .

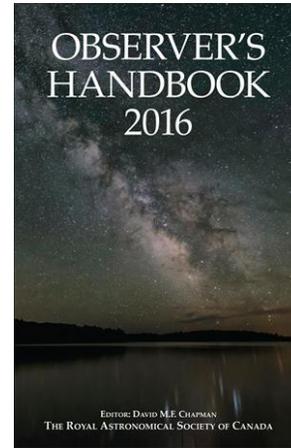


*Astronomy Magazine's* wall calendars - Deep Space Mysteries 2016 – will be sold at the next monthly meetings until all are copies are sold. 50 calendars were ordered, and they will sell again this year for \$8 each, which includes a \$1.50 donation to ATMob.

According to their website: “Deep Space Mysteries 2016 calendar is filled with stunning images of stars, planets, galaxies, and other deep space wonders. A highly informative essay accompanies each inspiring photograph. For each month,

celestial viewing opportunities, notable events, and national holidays are listed.”

## 2016 RASC Observer's Handbook for Sale . . .



Fifty (50) copies of the *Royal Astronomical Society of Canada (RASC) Observer's Handbook 2016* have been received.

This guide is published annually and is regarded as an excellent reference for data on the sky. The first handbook was published in 1907, making this its 107th year of publication. The 2016 guide has 352 pages. The 24-page section called “The Sky Month By Month” has an extensive listing of events for each month of the year. See <http://www.rasc.ca/handbook> for more details.

They will be ready for distribution at the Thursday, November 12th and the December 12th monthly meeting. Please email Eileen directly at [starleen@charter.net](mailto:starleen@charter.net) to reserve a copy, \$20 each.

~ Submitted by Eileen Myers ~

Editor: \* Photos by Al Takeda unless otherwise noted.

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**November Star Fields DEADLINE  
Sunday, October 25<sup>th</sup>**

**Email articles to Al Takeda at  
[newsletter@atmob.org](mailto:newsletter@atmob.org)**

**Articles from members are always welcome.**

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**POSTMASTER NOTE:** First Class Postage Mailed October 28, 2015

Amateur Telescope Makers of Boston, Inc.  
c/o Tom McDonagh, Membership Secretary  
48 Mohawk Drive  
Acton, MA 01720  
**FIRST CLASS**

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STAR PARTY COORDINATOR:	Virginia Renehan	<a href="mailto:starparty@atmob.org">starparty@atmob.org</a>

**How to Find Us...**

**Web Page [www.atmob.org](http://www.atmob.org)**

**MEETINGS:** Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION see [www.atmob.org](http://www.atmob.org) and check your email on the ATMOB-ANNOUNCE list.

**CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W**

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.

**Heads Up For The Month . . .**

**To calculate Eastern Daylight Time (EDT) from Universal Time (UT) subtract 4 from UT.**

Oct 11 Uranus at opposition  
Oct 12 New Moon  
Oct 15 Mercury at greatest western elongation (Morning)  
Oct 20 First Quarter Moon (Moonset at midnight)  
Oct 21 Orionid Meteors peak  
Oct 27 Full Moon  
Nov 1 Daylight Saving Time Ends. EST= subtract 5 from UT  
Nov 3 Last Quarter Moon (Moonrise at midnight)  
Nov 11 New Moon